NAME _____ CLASS _____ DATE _____

Reteaching

1.1 Using Differences to Identify Patterns

◆ Skill A Extending a sequence by using differences

Recall To find the first differences, subtract each term from the next term. If the differences are not constant, use those differences and addition or subtraction to continue the sequence.

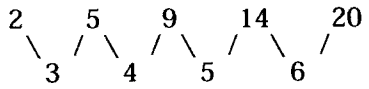
◆ **Example**

Find the next two terms in the sequence below.

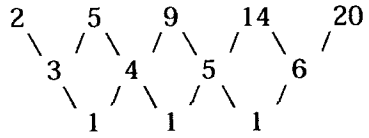
2, 5, 9, 14, 20, . . .

◆ **Solution**

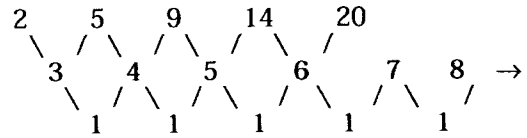
Find the first differences.

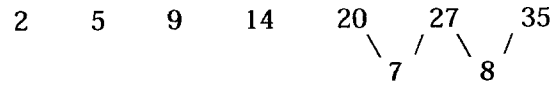


Since the first differences are not constant, find the second differences.



The second differences are a constant 1. Use the constant second difference to extend the sequence of first differences.





fifth term ↓ sixth term ↓

$20 + \mathbf{7} = 27 \qquad 27 + \mathbf{8} = 35$

↑ sixth term ↑ seventh term

NAME _____ CLASS _____ DATE _____

Find the next two terms in each sequence using constant differences. Show your work.

1. 5, 8, 12, 17, 23, . . . _____

2. 5, 13, 21, 29, 37, . . . _____

3. 38, 29, 21, 14, . . . _____

4. 23, 22, 20, 17, 13, . . . _____

5. 8, 16, 24, 32, 40, . . . _____

6. 100, 97, 94, 91, 88, . . . _____

7. 30, 31, 35, 42, 52, . . . _____

8 1, 4, 9, 16, 25, . . . _____

9. 12, 0, −12, −24, −36, . . . _____

10. −3, −8, −13, −18, −23, . . . _____

11. −1, 1, 7, 17, 31, . . . _____

12. 4, 3, 0, −5, −12, . . . _____

13. The fourth and fifth terms of a sequence are 39 and 54. The second differences are a constant 3. What are the first three terms of the sequence?

_____

14. The first term of a sequence is 8. The first of the first differences is 3. The second differences are a constant 1. What are the first five terms of the sequence?

_____

NAME _____ CLASS _____ DATE _____

Reteaching

5.1 Linear Functions and Graphs

◆ Skill A Determining whether a relation is a function

Recall A relation is any set of ordered pairs. The first members of the ordered pairs constitute the domain of the relation, and the second members of the ordered pairs constitute the range of the relation. If each member of the domain is paired with exactly one member of the range, then the relation is a function.

◆ **Example**

Determine whether each set of ordered pairs is a function. Describe the domain and range for each.

a. $(-3.2, 5), (5, 3.2), (11.4, -3), (5.6, 7), (8, 0), (-9, 9), (5, 3.1)$

b. $(-5, 5), (-4, 4), (-3, 3), (-2, 2), (0, 0), (2, 2), (3, 3), (5, 5)$

◆ **Solution**

a. To see if the relation is a function, examine the first members in the ordered pairs. If any first member is paired with more than one second member, the relation is not a function.

$5 \longrightarrow 3.2$
$5 \longrightarrow 3.1$

Because 5 is paired with both 3.2 and 3.1, the relation is not a function.
domain: $\{-3.2, 5, 11.4, 5.6, 8, -9\}$
range: $\{5, 3.2, -3, 7, 0, 9, 3.1\}$

b. For each first member, there is a different second member, so this relation is a function.
domain: $\{-5, -4, -3, -2, 0, 2, 3, 5\}$
range: $\{5, 4, 3, 2, 0\}$

Determine whether each set of ordered pairs is a function. Describe the domain and range for each.

1. $\{(1.3, -1.3), (3.1, 2.3), (10, 10), (12, 21)\}$

_____

domain: _____

range: _____

2. $\{(1, 64), (2, 32), (3, 16), (4, 8), (5, 4), (6, 2)\}$

_____

domain: _____

range: _____

3. $\{(-3, 7), (-5, 7), (8, 7), (10, 7), (-3, 8)\}$

_____

domain: _____

range: _____

4. $\{(18, 11), (20, 12), (-20, -8), (-7, -1.5), (8, -1.5)\}$

_____

domain: _____

range: _____

NAME _____ CLASS _____ DATE _____

◆ Skill B Determining a range value or a domain value given one of them and an equation

Recall When you solve an equation in one variable, you use the properties of equality.

◆ **Example**

The variables x and y are related by the equation $4x + 7y = 28$. Find each domain or range value. Then write the ordered pair that satisfies the equation.

a. Find x given that $y = 3$. **b.** Find y given that $x = -2$.

◆ **Solution**

a. Substitute 3 for y in $4x + 7y = 28$. Then solve for x.

$4x + 7(3) = 28$ Let y equal 3.

$4x + 21 = 28$

$4x = 7$ Subtract 21 from each side of the equation.

$x = \frac{7}{4}$, or $1\frac{3}{4}$ Divide each side by 4.

Thus, $\left(3, 1\frac{3}{4}\right)$ satisfies $4x + 7y = 28$.

b. Substitute -2 for x in $4x + 7y = 28$. Then solve for y.

$4(-2) + 7y = 28$ Let x equal -2.

$-8 + 7y = 28$

$7y = 36$ Add 8 to each side of the equation.

$y = \frac{36}{7}$, or $5\frac{1}{7}$ Divide each side by 7.

Thus, $\left(-2, 5\frac{1}{7}\right)$ satisfies $4x + 7y = 28$.

Complete each ordered pair so that it is a solution to the given equation.

5. $(-4, ?)$ and $(?, 10)$; $2x + \frac{1}{2}y = 8$

_____

6. $(0, ?)$ and $\left(?, \frac{1}{4}\right)$; $-\frac{1}{2}x - 3y = 15$

_____

◆ Skill C Writing a linear equation to represent a table of values

Recall A relationship is linear if y changes by a constant amount for a fixed increase in x-values.

◆ **Example**

Write a linear equation in x and y for this table.

x	1	2	3	4	5
y	7	10	13	16	19

◆ **Solution**

For each increase of 1 in the x-values, y increases by 3. Thus, when $x = 0$, $y = 7 - 3 = 4$. An equation that represents the table is $y = 3x + 4$.

Write a linear equation to represent each table of values.

7. _____

x	1	2	3	4	5
y	5	11	17	23	27

8. _____

x	1	2	3	4	5
y	4.4	8.4	12.4	16.4	20.4

NAME _____ CLASS _____ DATE _____

Reteaching

14.1 Graphing Functions and Relations

◆ Skill A Understanding differences between relations and functions

Recall A relation is a set of ordered pairs.
A function is a relation in which each x-coordinate is paired with exactly one y-coordinate.

◆ **Example**
State whether each set of ordered pairs is a function.
a. $\{(3, 1), (4, 6), (0, 1), (3, 2), (-4, 6), (5, 2)\}$
b. $\{(1, 0), (-5, 9), (4, 6), (2, 3), (5, 8), (-2, 4), (0, 4)\}$

◆ **Solution**
a. If all the x-coordinates are different, the set is a function. If any x-coordinates repeat, check their y-coordinates. Because (3, 1) and (3, 2) have the same x-coordinate but different y-coordinates, the relation is not a function.
b. Because all the x-coordinates are different, the set is a function.

Decide whether each set is a function.

1. $\{(3, 5), (2, 6), (4, 6), (-1, 6), (5, 8)\}$ _____

2. $\{(1, 0), (1, 4), (1, -3)\}$ _____

3. $\{(-6, 8), (6, 8), (-5, 7), (5, 7)\}$ _____

4. $\{(5, 1), (4, 2), (3, 3), (2, 4)\}$ _____

◆ Skill B Using the $f(x)$ function notation to represent and evaluate functions

Recall

$$f(x) = \underbrace{ax^2 + bx + c}_{\text{function rule}}$$

$f(x)$: replacement variable

Substitute the value of the replacement variable into the function rule and simplify.

◆ **Example**
Let $f(x) = 5x^2 - 3x + 2$. Find $f(3)$.

◆ **Solution**
Replace each x in the function rule with a 3.

$$\begin{aligned} f(3) &= 5(3)^2 - 3(3) + 2 \\ &= 5(9) - 3(3) + 2 \\ &= 45 - 9 + 2 \\ &= 38 \end{aligned}$$

Thus, $f(3) = 38$.

Evaluate each function.

5. Let $f(x) = 7x^2 - 5x$. Find $f(-2)$. _____

6. Let $g(x) = -x^2 + 2x$. Find $g(4)$. _____

NAME _____ CLASS _____ DATE _____

Evaluate each function when x is -3.

7. $f(x) = -2x^2 - x$ _____

8. $g(x) = \frac{1}{x^2}$ _____

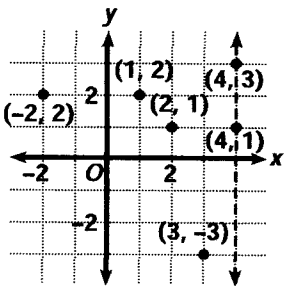
◆ Skill C Using the vertical-line test to identify functions

Recall Two points whose x-coordinates are the same but whose y-coordinates are different lie on the same vertical line.

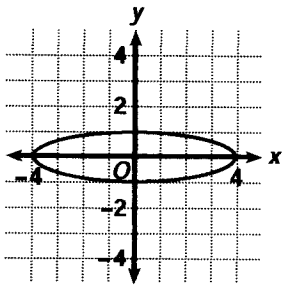
◆ **Example**

Use the vertical-line test to decide whether each graph represents a function.

a.



b.



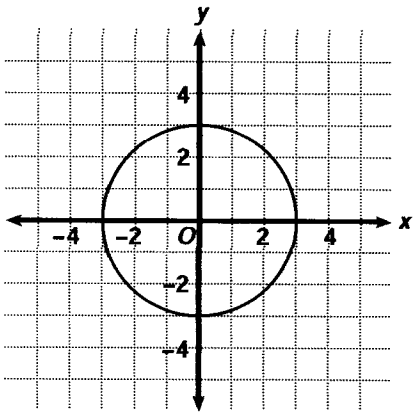
◆ **Solution**

a. The relation shown has six points. Two of these points lie on the vertical line $x = 4$. Therefore, the graph does not represent a function.

b. Because any vertical line drawn between $x = -4$ and $x = 4$ will cross the graph at more than one point, the graph does not represent a function.

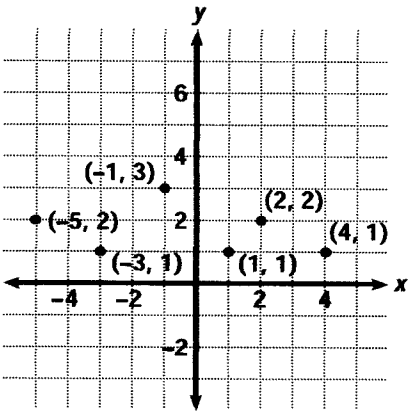
Use the vertical-line test to decide whether each graph represents a function.

9.



_____

10.



_____

NAME _____ CLASS _____ DATE _____

Practice Masters Level B

14.1 Graphing Functions and Relations

Tell whether the relation is a function. Give a reason for each answer.

1. $\{(1, 2), (-1, 2), (5, 2)\}$ _____

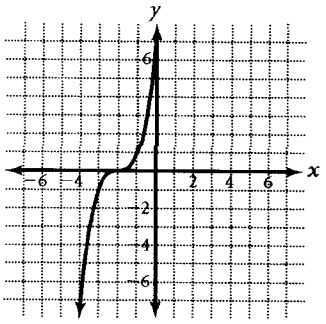
2. $\{(3, 8)\}$ _____

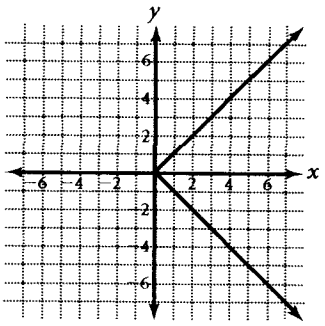
3. $\{(0, -5,), (1, -6), (1, 2), (3, -8)\}$ _____

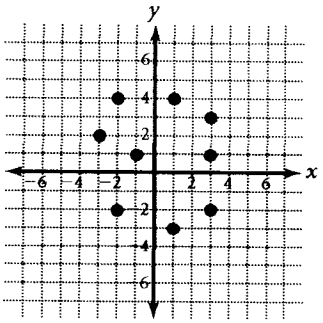
4. $\{(4, -1,), (-2, 3), (-2, 8)\}$ _____

Which of the following graphs represent functions? Give two reasons for each answer.

5. _____ 6. _____ 7. _____







For $g(x) = x^2 - 5$, evaluate the following:

8. $g(0)$ _____ 9. $g(-1)$ _____ 10. $g\left(\frac{1}{2}\right)$ _____

11. $g(-2)$ _____ 12. $g(1)$ _____ 13. $g(5)$ _____

Evaluate each function for $x = -5$.

14. $f(x) = x^2 - 2x + 5$ _____ 15. $g(x) = |2x - 8|$ _____

16. $m(x) = \frac{1}{x + 2}$ _____ 17. $p(x) = \sqrt{x + 30}$ _____

Identify the parent function for each of the following functions.

18. $h(x) = \frac{1}{x + 5}$ _____ 19. $m(x) = \sqrt{x - 8}$ _____ 20. $p(x) = (x + 2)^2 + 5$ _____